MINISTRY OF FORESTS LIBRARY
PO BOX 9523 STN PROV GOVT
VICTORIA BC V8W 9C2

RESEARCH SUMMARY

forest sciences

NELSON FOREST REGION

November 1996 RS-029

CASE STUDY: Patch Cutting in Old-Growth to Maintain Early Winter Caribou Habitat

*By Lauren Waters**

- **Patch cuts of 1 to 2 ha are operationally feasible**

INTRODUCTION

In 1994 the Revelstoke Forest District Small Business Forest Enterprise Program (SBFEP) initiated an operational patch cutting trial in an old-growth Interior Cedar-Hemlock stand. The objective was to harvest timber yet maintain old-growth attributes to continue to provide early winter habitat for caribou.

Integrating mountain caribou and timber management in the Revelstoke Forest District is a challenge that was clearly recognized during the Land Use Planning process of the Commission on Resources and Environment (CORE). This issue is important to the community of Revelstoke because over the next decade a significant proportion of the annual allowable cut will be harvested from critical caribou habitat areas.

Caribou are old growth dependent, and require large areas of suitable habitat. Suitable early winter habitat consists of forests with certain attributes: arboreal lichen (found mainly on older trees), falsebox (understory shrub), and a closed canopy for snow interception. Harvesting methods that maintain these characteristics have the potential to maintain caribou habitat while allowing access to merchantable timber.

The specific objectives of this trial are:

1. To continue to provide early winter caribou habitat by:
   i) maintaining mature and old growth (80-240 years) on 50% of the area in perpetuity.
   ii) providing windfirm habitat by removing app. 30% of the stand volume in the first of four entries, scheduled every 60 years.
   iii) maintaining the *Paxistima* and avoiding enhancing forage for deer and moose by minimizing soil and vegetation disturbance.
   iv) maintaining freedom of movement for caribou by avoiding excessive coarse woody debris.
   v) maximizing snow interception by maintaining a dense canopy closure (65-90% crown closure) on 50% of the area in perpetuity.
2. To harvest merchantable timber and artificially regenerate with cedar, hemlock, and spruce for pulp, sawlog, and peeler grade forest products within a rotation period of 240 years.
3. To demonstrate the operational feasibility of conventionally harvesting patch cuts with small wildlife tree reserves.
4. To evaluate the extra cost associated with this prescription compared to a conventional clearcut.
5. To monitor the silvicultural feasibility of this prescription.

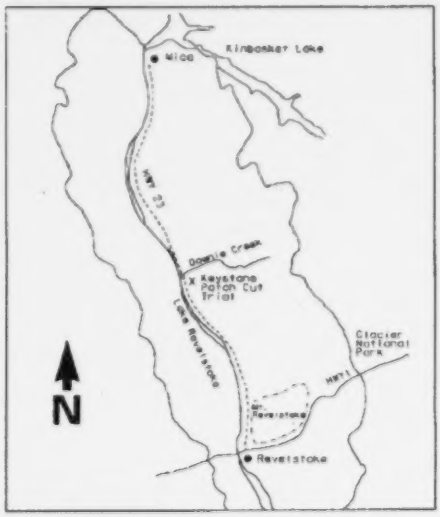


Figure 1 Study site location.

*Forestry Consultant, L.G. Waters Ltd., Revelstoke, B.C.

634.909711
BCMF
RES
NE
RS
1990-

106-05504/

The study site is located 50 km north of Revelstoke, B.C. in the Keystone area on Revelstoke Community Forest Corporation's (RCFC) TFL 56 (Figure 1).

SITE DESCRIPTION/PRESCRIPTION DEVELOPMENT

The site is located in the Interior Cedar-Hemlock moist cool variant (ICHwk1), and the elevation ranges from 950 to 1050 m. The block was originally to be a 35.1 ha clearcut. However, the site is surrounded by early seral stages, which limits this area's value as early winter caribou habitat. At the request of the Ministry of Environment Lands and Parks (MOE) it was re-engineered as a patch cut with wildlife tree clumps. The intent of the prescription is to develop a mosaic of different age-classes throughout the area within a rotation period of 240 years.

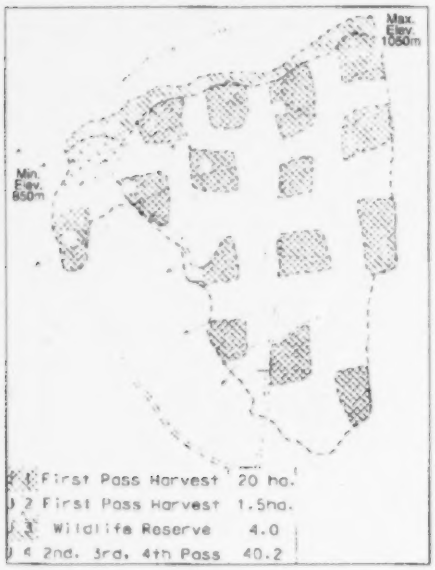

Max. Elev. 1050m
Min. Elev. 950m
1 First Pass Harvest 20 ha.
2 First Pass Harvest 1.5ha.
3 Wildlife Reserve 4.0
4 2nd, 3rd, 4th Pass 40.2

Figure 2 Block layout.

A total of 16 patch clearcuts with wildlife tree reserves ranging from 1.06 to 2.02 ha in size were harvested in the first pass within a 71.0 ha total gross area. The total trial area consists of four Treatment Units (TU's) (Figure 2). In TU 1, where 15 patches are located, the slopes are moderate, ranging from 5 to 25% slopes, and the sites are mesic to subhygric. TU 2 is a 1.6 ha patch with wetter soils and steeper slopes (15 to 55%). TU 3 is a permanent 4 ha reserve adjacent to Skunk Creek, and TU 4 is the remainder of the area (42.98 ha), which will have three more passes harvested from it in 60, 120 and 180 years.

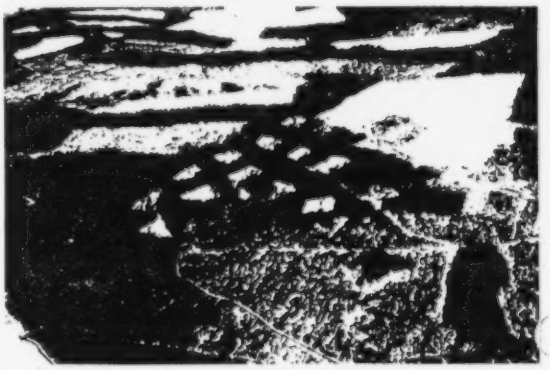
The road was laid out prior to determining the location of the patches. A total chance plan divided the area into four passes. All trails were designed to incorporate future passes.

A pixel survey was completed in the fall of 1993. TU 1, 2, and 4 had 8% Armillaria root disease and TU 3 had 6%. Armillaria root disease levels will be monitored to determine if this method of harvesting increases the rate of spread.

HARVESTING OPERATIONS

Harvesting commenced during the winter of 1995. Two and a half patches were logged between mid February and March 7, 1995. The remaining 15 patches were harvested between January 12 and March 14, 1996. A total of 10 126 m^3 was removed from the 16 patches. The snow depth on the block ranged from 90 to 250 cm during harvesting.

An Ex 200 hoe/excavator was used to hoe chuck the wood to the designated skid trails. A 518 Cat and John Deere 450 and 667 dozer were used to skid the logs. All of the skid trails were pre-located to minimize site disturbance. Special attention was given to directionally felling around the wildlife tree reserves.



Patch cuts surrounded by early seral stages.

PRELIMINARY RESULTS

Wildlife Tree Reserves

One of the objectives in the pre-harvest silviculture prescription (PHSP) was to retain one to four wildlife tree clumps in each patch in perpetuity. Each clump was to consist of four to 15 stems of dominant and co-dominant cedar, hemlock, and spruce, including a wide range of hard and soft snags and diameter classes.

The wildlife tree clumps were marked prior to harvesting. Some of the trees marked for retention for wildlife reasons were "green danger trees" or snags that legally had to be felled to meet Workers Compensation Board regulations. The faller was permitted to chose other safe green trees to replace the marked wildlife reserve danger trees.

Directional falling overmature stems around the wildlife tree clumps was difficult because wedges were of limited use in trees with hollow centers. For future cuts, it was recommended that wildlife trees reserves in the openings be dropped in favour of reserves at the edge of the openings. These wildlife tree reserves should then be maintained in perpetuity on the edges of the patches.

Wildlife Tree Reserve.

Coarse Woody Debris (CWD)

One objective of the PHSP was to leave 15 m^3 of CWD on all openings post harvest. MOE expressed concerns that there was insufficient large diameter CWD left on site. A waste and residue survey will be completed on the entire block in 1996 tallying all coarse woody debris. However, preliminary results from the 1995 waste and residue survey (completed on the two patches harvested in 1995) indicated approximately 12.4 m^3/ha of merchantable timber left which would be close to meeting the CWD objectives once Grade 5 and reject classes were added.

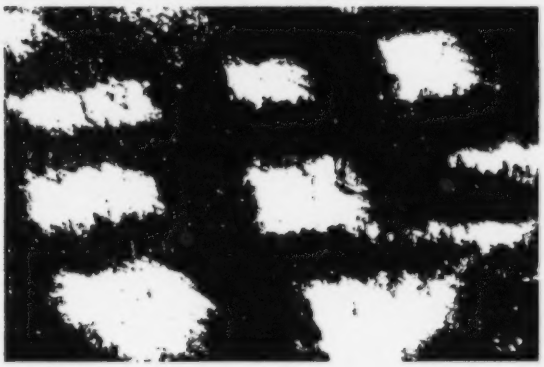
Regeneration

A plantable spot survey was conducted on the two clearcut patches harvested in 1995. The number of plantable spots ranged from 1100 to 1200/ha which should achieve the target stocking objectives of 1200 stems/ha.

Another objective of the PHSP was to retain all residual tree species <17.5 cm dbh, including all soft and hard snags. The main reason for retaining the advance regeneration was to reduce the fine fuel loading post harvest. However, the slash loading appeared to be relatively high. An assessment will be conducted post harvest to determine if hazard abatement by mechanical site preparation or spot burning is required. The majority of the stems will not form part of the next crop because they do not meet the advance regeneration acceptability criteria.

Costs

Extra layout, wildlife tree marking and numerous joint agency field trips added to the planning costs. The total cost for this project was approximately $28,000. This is estimated to be approximately double the costs to plan and prepare a comparable conventional block. Costs should decline as experience is gained.



Individual patches

Future Plans

In the spring of 1997, all patches will be planted with a mix of cedar, hemlock and spruce seedlings. The following features will be monitored:

1. Regeneration establishment and performance, including advanced regeneration.
2. Understory vegetation development
3. Effects of Armillaria root disease on planted seedlings and residual trees
4. Windthrow
5. Snow characteristics and interception
6. Lichen distribution
7. Coarse woody debris

SUMMARY

Patch clearcut with wildlife tree reserves is generally operationally feasible on conventional ground in the ICHwk1. However, some difficulties were encountered with directional falling overmature stems around wildlife tree patches. The intent of this prescription was to meet adjacency rules and to provide for early winter caribou habitat. This block will be monitored for silvicultural feasibility and effectiveness in maintaining early winter caribou habitat over the longer run.

FOR MORE INFORMATION CONTACT

Bruce McLellan, Biologist
Ministry of Forests, Research Branch
Revelstoke, B.C.
837-7611
bmclellan@mfor01.for.gov.bc.ca

Lauren Waters, Forestry Consultant
Revelstoke, B.C.
837-6622
lwaters@junction.net

Earl Hunt, Zone Officer
Ministry of Forests, Revelstoke District Office
Revelstoke, B.C.
837-7611
ehunt@mfor01.for.gov.bc.ca

EHUNT@MFOR01.FOR.GOV.BC.CA

Kevin lavelle, Zone Officer
Ministry of Forests, Revelstoke District Office
Revelstoke, B.C.
837-7611
klavelle@mfor01.for.gov.bc.ca

On case studies initiative:
Deb DeLong, Silvicultural System Research Forester
Nelson, B.C.
354-6285
ddelong@mfor01.for.gov.bc.ca